



Zika Virus

The latest emerging arbovirus in the Americas

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Zika Virus

- Single stranded RNA Virus
- Genus *Flavivirus*, Family *Flaviviridae*
- Closely related to dengue, yellow fever, Japanese encephalitis and West Nile viruses
- Transmitted to humans primarily by *Aedes (Stegomyia)* species mosquitoes

Zika Virus Vectors: *Aedes* Mosquitoes

- *Aedes* species mosquitoes
 - *Ae aegypti* more efficient vectors for humans
 - *Ae albopictus*
- Also transmit dengue and chikungunya viruses
- Lay eggs in domestic water-holding containers
- Live in and around households
- Aggressive daytime biters



Aedes aegypti

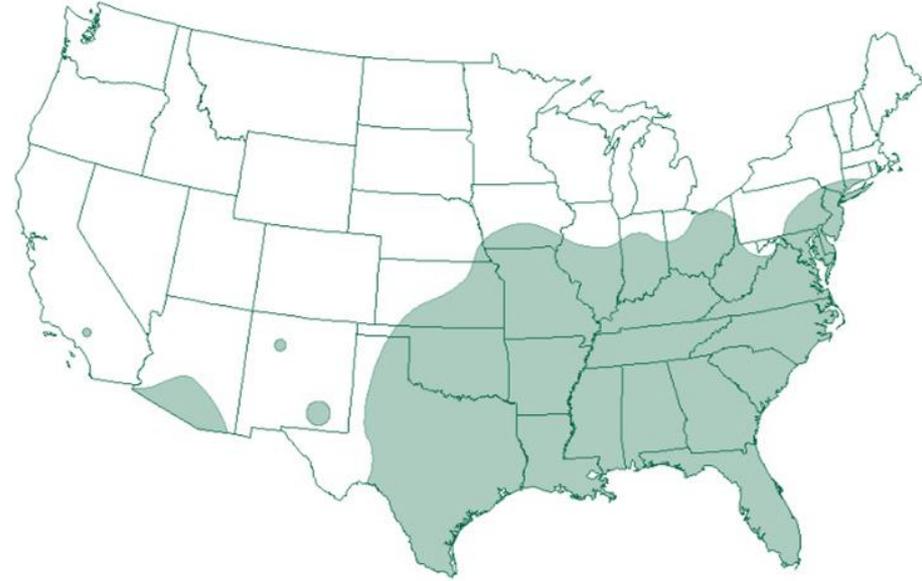


Aedes albopictus

Aedes aegypti and *Aedes albopictus* Mosquitoes: Geographic Distribution in the United States



Aedes aegypti



Aedes albopictus

Other Modes of Transmission

- Maternal-fetal
 - Intrauterine
 - Perinatal
- Other
 - Sexual
 - Blood transfusion
 - Laboratory exposure
- Theoretical
 - Organ or tissue transplantation
 - Breast milk



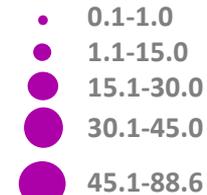
Rates of Microcephaly Over Time: the Americas and the Caribbean

Comparison of the rates of microcephaly in the Americas and Caribbean from 2010-2014 and 2015



Updated as of Epidemiological Week 52
(December 27, 2015 – January 2, 2016)

Microcephaly rates by state in Brazil
(cases per 1.000 live births)



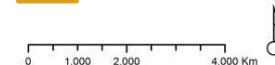
□ Countries

Countries with Zika confirmed cases

■ Epi Week 52 2015

□ Country limits

□ Brazil State Boundaries



Data Source:
Reported from the
IHR National Focal
Points and through
the Ministry of
Health websites.

Map Production:
PAHO-WHO AD
CHA IR ARO

Zika Virus Incidence and Attack Rates

- Infection rate: 73% (95%CI 68–77)
- Symptomatic attack rate among infected: 18% (95%CI 10–27)
- All age groups affected
- Adults more likely to present for medical care
- No severe disease, hospitalizations, or deaths

Note: Rates based on serosurvey on Yap Island, 2007 (population 7,391)

Duffy M. N Engl J Med 2009

Reported Clinical Symptoms Among Confirmed Zika Virus Disease Cases

Symptoms	N (n=31)	%
Macular or popular rash	28	90%
Subjective fever	20	65%
Arthralgia	20	65%
Conjunctivitis	17	55%
Myalgia	15	48%
Headache	14	45%
Retro-orbital pain	12	39%
Edema	6	19%
Vomiting	3	10%

Yap Island, 2007

Duffy M. N Engl J Med 2009

Clinical Features: Zika virus Compared to Dengue and Chikungunya

Features	Zika	Dengue	Chikungunya
Fever	++	+++	+++
Rash	+++	+	++
Conjunctivitis	++	-	-
Arthralgia	++	+	+++
Myalgia	+	++	+
Headache	+	++	++
Hemorrhage	-	++	-
Shock	-	+	-

Diagnostic Testing for Zika Virus

- Reverse transcriptase-polymerase chain reaction (RT-PCR) for viral RNA in serum collected ≤ 7 days after illness onset
- Serology for IgM and neutralizing antibodies in serum collected ≥ 4 days after illness onset
- Plaque reduction neutralization test (PRNT) for ≥ 4 -fold rise in virus-specific neutralizing antibodies in paired sera
- Immunohistochemical (IHC) staining for viral antigens or RT-PCR on fixed tissues

Possible Future Course of Zika virus in the Americas

- Virus will continue to spread in areas with competent vectors
 - Transmission increasing in Central America, Mexico, and Caribbean
 - Anticipate further spread in Puerto Rico and U.S. Virgin Islands
- Travel-associated cases will introduce virus to U.S. states
 - Imported cases will result in some local transmission and outbreaks
 - Air conditioning may limit the size and scope of outbreaks
 - Colder temperatures will interrupt and possibly stop further spread
- Experience from dengue might be predictive
 - From 2010–2014, 1.8 million dengue cases reported per year to PAHO
 - 558 travel-related and 25 locally transmitted cases in U.S. states